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# Example 4.5 #

# CreditMetrics #

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library(CreditMetrics)

set.seed(1234)

# function cm.cs

lgd <- 0.40

# one year empirical migration matrix

rc <- c("AAA", "AA", "A", "BBB", "BB", "B", "CCC", "D")

M <- matrix(c(90.81, 8.33, 0.68, 0.06, 0.08, 0.02, 0.01, 0.01,

 0.70, 90.65, 7.79, 0.64, 0.06, 0.13, 0.02, 0.01,

 0.09, 2.27, 91.05, 5.52, 0.74, 0.26, 0.01, 0.06,

 0.02, 0.33, 5.95, 85.93, 5.30, 1.17, 1.12, 0.18,

 0.03, 0.14, 0.67, 7.73, 80.53, 8.84, 1.00, 1.06,

 0.01, 0.11, 0.24, 0.43, 6.48, 83.46, 4.07, 5.20,

 0.21, 0, 0.22, 1.30, 2.38, 11.24, 64.86, 19.79,

 0, 0, 0, 0, 0, 0, 0, 100

 )/100, 8, 8, dimnames = list(rc, rc), byrow = TRUE)

cr.spread<-cm.cs(M, lgd)

# function cm.ref

r <- 0.03

ead <- c(40, 100, 50, 300, 150)

rating <- c("BB", "B", "CCC", "A", "B")

ref.val<-cm.ref(M, lgd, ead, r, rating)

ref.val$constVal

ref.val$constPV

# function cm.rnorm.cor

N <- 5

n <- 1000

firmnames <-

c("firm BB", "firm B", "firm CCC", "firm A", "firm B")

# correlation matrix

rho <- matrix(c( 1.0, 0.4, 0.6, 0.2, 0.1,

 0.4, 1.0, 0.5, 0.3, 0.2,

 0.6, 0.5, 1.0, 0.8, 0.7,

 0.2, 0.3, 0.8, 1.0, 0.6,

 0.1, 0.2, 0.7, 0.6, 1.0),

 5, 5, dimnames = list(firmnames, firmnames),

byrow = TRUE)

rand.cor<-cm.rnorm.cor(N, n, rho)

# function cm.state

state.space<-cm.state(M, lgd, ead, N, r)

n=1000

# function cm.quantile

cm.quantile(M)

# function cm.val

val<-cm.val(M, lgd, ead, N, n, r, rho, rating)

val

# function cm.gain

gain<-cm.gain(M, lgd, ead, N, n, r, rho, rating)

gain

# hist

#n=10000

gain<-cm.gain(M, lgd, ead, N, n, r, rho, rating)

hist.gain<-hist(-gain, col="steelblue4",

main="CLoss Distribution",

xlab="CLoss", ylab="frequency")